

ABSTRACT

INTRODUCTION:

Renal cell carcinoma, most common malignancy of kidney is predominantly disease of elderly. With a steady rise in global incidence of RCC number of incidentally detected disease and small, localised diseases are also increasing. Other than tumour stage, nuclear grade is considered an independent prognostic factor of RCC. Recently introduced dual energy CT which uses two different peak energies enables us to reconstruct virtual non contrast images, virtual monochromatic images and two material (commonly iodine and water) decomposition and quantification.

AIMS:

The aim of the study is to see whether iodine concentration in the clear cell renal cell carcinoma (RCC), obtained using iodine mapping in dual energy CT (DECT) can predict the nuclear grade of clear cell type of renal cell carcinoma.

OBJECTIVES:

- 1 To correlate iodine concentration in clear cell type of RCC can predict the nuclear grade of RCC.
- 2 To identify cut off values of iodine concentration which can best identify the nuclear grade of RCC.

MATERIALS & METHODS:

It was a prospective study conducted during the time period of September 2014 to July 2016. Institutional review board approved the study. All patients with suspected

or known renal mass referred for pre-operative CT abdomen was recruited for the study who underwent dual energy CT in arterial and venous phase in GE Discovery 750 HD CT machine. This is a single source fast kV switching dual energy CT machine. Water suppressed iodine density images are obtained to draw ROI in three different levels in RCC in both arterial and venous phases to get maximum, minimum and mean iodine concentration. ROIs are also drawn in aorta and normal kidney in arterial and venous phases. Post operatively histological types and nuclear grades were noted. Finally, patients with clear cell type of RCC are included for analysis

RESULTS & ANALYSIS:

Total 95 lesions were analysed in 95 different patients. For three patients with multiple RCCs larger lesion was considered for analysis. Predominantly cystic lesions did not correlate well with nuclear grade. Solid tumours show good correlation with nuclear grades. The mean iodine concentration in the venous phase showed maximum correlation to predict nuclear grade. Mean venous phase iodine concentration of 16.74 mg/cc or less was found to predict higher grades of RCC (grade 3 and 4) with 65% sensitivity and 81% specificity. Other factors which also show significant correlation with nuclear grades are minimum venous phase iodine concentration, ratio of minimum venous phase iodine concentration to mean iodine concentration in kidney and ratio of minimum iodine concentration in arterial phase to arterial phase mean kidney iodine concentration.

CONCLUSION:

The mean iodine concentration in the venous phase can predict nuclear grade with moderate accuracy for solid tumours. For predominantly cystic RCCs iodine concentration did not correlate with the nuclear grade.